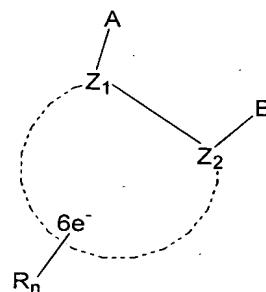


WHAT IS CLAIMED IS:

1. A method of increasing the vigor and/or the yield of an agronomic plant comprising treating the plant or its propagation material with a composition which comprises an effective amount of a fungicide which has no significant activity against fungal plant pathogens for such agronomic plant.

5 2. The method according to claim 1, wherein the fungicide comprises a compound having the formula



10 wherein Z_1 and Z_2 are C or N and are part of an aromatic ring selected from benzene, pyridine, thiophene, furan, pyrrole, pyrazole, thiazole, and isothiazole;

A is selected from $--C(X)\text{-amine}$, $--C(O)\text{-SR}_3$, $--NH\text{-C}(X)R_4$, and $--C(=NR_3)\text{-XR}_7$;

15 B is $--W_m\text{-Q(R}_2\text{)}_3$ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R_4 ;

Q is C, Si, Ge, or Sn;

W is $--C(R_3)_p\text{H}_{(2-p)}$; or when Q is C, W is selected from $--C(R_3)_p\text{H}_{(2-p)}$, $--N(R_3)_m\text{H}_{(1-m)}$, $--S(O)_p$, and $--O$;

20 X is O or S;

n is 0, 1, 2, or 3;

m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio) carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio) carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

wherein two R₂ groups may be combined to form a fused ring; each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

wherein two R₂ groups may be combined to form a cyclo group with Q;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino;

R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

or an agronomic salt thereof.

3. The method according to claim 2, wherein

Z₁ and Z₂ are C and are part of an aromatic ring which is thiophene;

A is selected from --C(X)-amine, --C(O)—SR₃, --NH--C(X)R₄, and --C(=NR₃)--XR₇;

B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

5 Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p)--; or when Q is C, W is selected from --C(R₃)_p H_(2-p)--, --N(R₃)_m H_(1-m)--, --S(O)_p--, and --O--;

X is O or S;

n is 0, 1, 2, or 3;

10 m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

15 b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

20 c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino,

25 dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino, and further when Q is C, R₂

may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino; and further when Q is C, then two R₂ groups may be combined to form a cycloalkyl group with Q;

R₃ is C₁-C₄ alkyl;

5 R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄ ; or an agronomic salt thereof.

4. The method according to claim 2, wherein

10 Z₁ and Z₂ are C and are part of an aromatic ring which is thiophene; A is selected from --C(X)-amine, wherein the amine is substituted with a first and a second amine substituent or with an alkylaminocarbonyl and a hydrogen, --C(O)--SR₃, --NH--C(X)R₄, and --C(=NR₃)-XR₇ ;

15 the first amine substituent is selected from the group consisting of C₁ - C₁₀ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkoxy, alkylthio, nitrile, alkylsulfonate, haloalkylsulfonate, phenyl, C₃ - C₆ cycloalkyl and C₅ - C₆ cycloalkylkenyl; phenyl optionally substituted with one or more C₁ - C₄ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof, cycloalkyl, cycloalkenyl, haloalkyl, alkoxy and nitro; C₃ - C₆ cycloalkyl, C₅ - C₆ cycloalkenyl, alkoxy, alkenoxy, alkynoxy, dialkylamino, and alkylthio;

20 and the second amine substituent is selected from the group consisting of hydrogen; C₁ - C₆ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkylcarbonyl, haloalkylcarbonyl, alkoxy carbonyl, and dialkylphosphonyl;

25 B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄ ;

30 Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p) --; or when Q is C, W is selected from --C(R₃)_p H_(2-p) --, --N(R₃)_m H_(1-m) --, --S(O)_p --, and --O--;

X is O or S;

n is 2;

m is 0 or 1;

p is 0, 1, or 2;

5 wherein two R groups are combined to form a nonheterocyclic ring fused with the thiophene ring, which is not a benzothiophene other than a tetrahydrobenzothiophene, said two R groups being selected from the group consisting of C₁ - C₄ alkyl, alkenyl, C₃ - C₆ cycloalkyl and cycloalkenyl, each optionally substituted with hydroxy, thio, phenyl, C₁ - C₄ 10 alkoxy, alkylthio, alkylsulfinyl, or alkylsulfonyl;

each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein when Q is C, R₂ may also be selected from halo, 15 alkoxy, alkylthio, alkylamino, and dialkylamino; and further when Q is C, then two R₂ groups may be combined to form a cycloalkyl group with Q;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

20 R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

or an agronomic salt thereof

5. The method according to claim 2, wherein

Z₁ and Z₂ are C and are part of an aromatic ring which is thiophene;

25 A is --C(X)-amine wherein the amine is an N-bonded heterocyclic compound chosen from the group consisting of morpholine, piperazine, piperidine, and pyrrolidine, each optionally substituted with C₃ - C₆ alkyl groups;

B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

30 Q is C or Si;

W is --C(R₃)_p H_(2-p) --; or when Q is C, W is selected from --C(R₃)_p H_(2-p) --, --N(R₃)_m H_(1-m) --, --S(O)_p --, and --O--;

X is O;

n is 2;

m is 0 or 1;

p is 0, 1, or 2;

5 wherein the two R groups are alkenyl groups and are combined to form a fused ring with the thiophene ring with is benzothiophene; wherein the alkenyl groups are optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₂ - C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

10 each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, and phenyl, each optionally substituted with R₄ or halogen; and wherein when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino; or wherein two R₂ groups

15 15 may be combined to form a cyclo group with Q;

R₃ is C₁-C₄ alkyl; and

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino;

or an agronomic salt thereof

20 6. The method according to claim 2, wherein

Z₁ and Z₂ are C and are part of an aromatic ring which is benzothiophene; and

A is selected from --C(X)-amine wherein the amine is an unsubstituted, monosubstituted or disubstituted nonheterocyclic amino radical, --C(O)—SR₃, --NH--C(X)R₄, and --C(=NR₃)--XR₇;

25 B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p)--; or when Q is C, W is selected from --C(R₃)_p H_(2-p)--, --N(R₃)_m H_(1-m)--, --S(O)_p--, and --O--;

30 X is O or S;

n is 0, 1, 2, or 3;

m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato,

5 trimethylsilyl, and hydroxy;

b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl,

each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano;

formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino,

dialkylamino, alkoxy carbonyl, (alkylthio) carbonyl, alkylaminocarbonyl,

dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

10

c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with

halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy,

alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy,

15

cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino,

dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl,

dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl,

(alkylthio) carbonyl, phenylcarbonylamino, phenylamino, each optionally

substituted with halo;

20

each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

wherein two R₂ groups may be combined to form a cyclo group with

25

Q which is 1-methylcyclopropyl, 1-methylcyclopentyl, or 1-methylcyclohexyl;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

30

R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

or an agronomic salt thereof

7. The method according to claim 2, wherein
Z₁ and Z₂ are C or N and are part of an aromatic ring which is furan;
and

A is selected from --C(X)-amine wherein the amine is substituted
5 with a first and a second amine substituent or with an alkylaminocarbonyl
and a hydrogen, --C(O)—SR₃, --NH--C(X)R₄, and --C(=NR₃)--XR₇ ;
the first amine substituent is selected from the group consisting of
C₁ - C₁₀ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures
thereof optionally substituted with one or more halogen, hydroxy, alkoxy,
10 alkylthio, nitrile, alkylsulfonate, haloalkylsulfonate, phenyl, a 5-membered
heteroaryl, C₃ - C₆ cycloalkyl and C₅ - C₆ cycloalkylkenyl; phenyl optionally
substituted with one or more C₁ - C₄ straight or branched alkyl, alkenyl, or
alkynyl groups or mixtures thereof, cycloalkyl, cycloalkenyl, haloalkyl,
15 alkoxy and nitro; C₃ - C₆ cycloalkyl, C₅ - C₆ cycloalkenyl, alkoxy, alkenoxy,
alkynoxy, dialkylamino, and alkylthio;
and the second amine substituent is selected from the group
consisting of hydrogen; C₁ - C₆ straight or branched alkyl, alkenyl, or
alkynyl groups or mixtures thereof optionally substituted with one or more
halogen, hydroxy, alkylcarbonyl, haloalkylcarbonyl, alkoxycarbonyl, and
20 dialkylphosphonyl;
B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl,
and 9-phenanthryl, each optionally substituted with halogen or R₄ ;
Q is C, Si, Ge, or Sn;
W is --C(R₃)_p H_(2-p) --; or when Q is C, W is selected from --C(R₃)_p
25 H_(2-p) --, --N(R₃)_m H_(1-m) --, --S(O)_p --, and --O--;
X is O or S;
n is 0, 1, or 2;
m is 0 or 1;
p is 0, 1, or 2;
30 each R is independently selected from
a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato,
trimethylsilyl, and hydroxy;

5 b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

10 c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

15 d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

20 wherein two R groups may be combined to form a fused ring; each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

25 wherein two R₂ groups may be combined to form a cyclo group with Q which is 1-methylcyclopropyl, 1-methylcyclopentyl, or 1-methylcyclohexyl;

 R₃ is C₁-C₄ alkyl;

 R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

 R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

 or an agronomic salt thereof

 8. The method according to claim 2, wherein

30 Z₁ and Z₂ are C and are part of an aromatic ring which is benzothiophene; and

A is selected from --C(X)-amine wherein the amine is an unsubstituted, monosubstituted or disubstituted nonheterocyclic amino radical, --C(O)—SR₃, --NH--C(X)R₄, and --C(=NR₃)--XR₇;

5 B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p)--; or when Q is C, W is selected from --C(R₃)_p H_(2-p)--, --N(R₃)_m H_(1-m)--, --S(O)_p--, and --O--;

X is O or S;

10 n is 0, 1, 2, or 3;

m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

15 a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio)carbonyl, alkylaminocarbonyl,

20 dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

c) phenyl, furyl, thieryl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

25 30 each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or

halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

wherein two R₂ groups may be combined to form a cyclo group with Q which is 1-methylcyclopropyl, 1-methylcyclopentyl, or 1-methylcyclohexyl;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

or an agronomic salt thereof.

9. The method according to claim 2, wherein

Z₁ and Z₂ are C and are part of an aromatic ring which is furan; and A is selected from --C(X)-amine wherein the amine is substituted

with a first and a second amine substituent or with an alkylaminocarbonyl and a hydrogen, --C(O)—SR₃, --NH—C(X)R₄, and --C(=NR₃)—XR₇;

the first amine substituent is selected from the group consisting of C₁ - C₁₀ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkoxy, alkylthio, nitrile, alkylsulfonate, haloalkylsulfonate, phenyl, a 5-membered heteroaryl, C₃ - C₆ cycloalkyl and C₅ - C₆ cycloalkylkenyl; phenyl optionally substituted with one or more C₁ - C₄ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof, cycloalkyl, cycloalkenyl, haloalkyl, alkoxy and nitro; C₃ - C₆ cycloalkyl, C₅ - C₆ cycloalkenyl, alkoxy, alkenoxy, alkynoxy, dialkylamino, and alkylthio;

and the second amine substituent is selected from the group consisting of hydrogen; C₁ - C₆ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkylcarbonyl, haloalkylcarbonyl, alkoxycarbonyl, and dialkylphosphonyl;

B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is C, Si, Ge, or Sn;
W is --C(R₃)_p H_(2-p) --; or when Q is C, W is selected from --C(R₃)_p
H_(2-p) --, --N(R₃)_m H_(1-m) --, --S(O)_p --, and --O--;
X is O or S;
5 n is 0, 1, or 2;
m is 0 or 1;
p is 0, 1, or 2;
each R is independently selected from
a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato,
10 trimethylsilyl, and hydroxy;
b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl,
each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano,
formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino,
dialkylamino, alkoxy carbonyl, (alkylthio) carbonyl, alkylaminocarbonyl,
15 dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;
c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with
halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy,
alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;
d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy,
20 cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino,
dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl,
dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl,
(alkylthio) carbonyl, phenylcarbonylamino, phenylamino, each optionally
substituted with halo;
25 wherein two R groups may be combined to form a fused ring;
each R₂ is independently selected from alkyl, alkenyl, alkynyl,
cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or
halogen; and wherein, when Q is C, R₂ may also be selected from halo,
alkoxy, alkylthio, alkylamino, and dialkylamino;
30 wherein two R₂ groups may be combined to form a cyclo group with
Q which is 1-methylcyclopropyl, 1-methylcyclopentyl, or 1-
methylcyclohexyl;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

5 R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

or an agronomic salt thereof.

10 ~~10.~~ The method according to claim 2, wherein Z₁ and Z₂ are C and are part of an aromatic ring which is pyridine; and

15 A is selected from the group consisting of --C(O)—SR₃, --NH--C(X)R₄, and --C(=NR₃)--XR₇ and --C(X)-amine wherein the amine is substituted with alkylaminocarbonyl and a hydrogen or wherein the amine has a first and a second amine substituent;

20 the first amine substituent is selected from the group consisting of C₁ - C₁₀ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkoxy, alkylthio, nitrile, alkylsulfonate, haloalkylsulfonate, phenyl, a 5-membered heteroaryl, C₃ - C₆ cycloalkyl and C₅ - C₆ cycloalkylkenyl; phenyl optionally substituted with one or more C₁ - C₄ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof, cycloalkyl, cycloalkenyl, haloalkyl, alkoxy and nitro; C₃ - C₆ cycloalkyl, C₅ - C₆ cycloalkenyl, alkoxy, alkenoxy, alkynoxy, dialkylamino, and alkylthio;

25 and the second amine substituent is selected from the group consisting of hydrogen; C₁ - C₆ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkylcarbonyl, haloalkylcarbonyl, alkoxy carbonyl, and dialkylphosphonyl;

30 B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p)--; or when Q is C, W is selected from --C(R₃)_p H_(2-p)--, --N(R₃)_m H_(1-m)--, --S(O)_p--, and --O--;

X is O or S;
n is 0, 1, or 2;
m is 0 or 1;
p is 0, 1, or 2;

5 each R is independently selected from

- a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;
- b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio) carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;
- c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;
- d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio) carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino; or wherein two R₂ groups may be combined to form a cyclo group with Q which is 1-methylcyclopropyl, 1-methylcyclopentyl, or 1-methylcyclohexyl;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

or an agronomic salt thereof.

11. The method according to claim 2, wherein
Z₁ and Z₂ are C and are part of an aromatic ring which is benzene;
and

5 A is selected from the group consisting of --C(X)-amine wherein the
amine is substituted with a first and a second amine substituent or with an
alkylaminocarbonyl and a hydrogen; --C(O)—SR₃, --NH--C(X)R₄, and --
C(=NR₃)--XR₇;

10 the first amine substituent is selected from the group consisting of
C₁ - C₁₀ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures
thereof optionally substituted with one or more halogen, hydroxy, alkoxy,
alkylthio, nitrile, alkylsulfonate, haloalkylsulfonate, phenyl, C₃ - C₆
cycloalkyl and C₅ - C₆ cycloalkylkenyl; phenyl optionally substituted with
one or more C₁ - C₄ straight or branched alkyl, alkenyl, or alkynyl groups
15 or mixtures thereof, cycloalkyl, cycloalkenyl, haloalkyl, alkoxy and nitro; C₃
- C₆ cycloalkyl, C₅ - C₆ cycloalkenyl, alkoxy, alkenoxy, alkynoxy,
dialkylamino, and alkylthio;

20 and the second amine substituent is selected from the group
consisting of hydrogen; C₁ - C₆ straight or branched alkyl, alkenyl, or
alkynyl groups or mixtures thereof optionally substituted with one or more
halogen, hydroxy, alkylcarbonyl, haloalkylcarbonyl, alkoxycarbonyl, and
dialkylphosphonyl;

25 B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl,
and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p) --;

X is O or S;

n is 0, 1, 2 or 3;

m is 0 or 1;

30 p is 0, 1, or 2;

each R is independently selected from

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a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

5 b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxycarbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

10 c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

15 d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxycarbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

20 each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

25 R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄ ;

or an agronomic salt thereof.

12. The method according to claim 2, wherein

Z₁ and Z₂ are C and are part of an aromatic ring which is furan; and

30 A is selected from --C(X)-amine wherein the amine is substituted with a first and a second amine substituent or with an alkylaminocarbonyl and a hydrogen, --C(O)—SR₃, --NH—C(X)R₄, and --C(=NR₃)—XR₇ ;

the first amine substituent is selected from the group consisting of C₁ - C₁₀ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures

thereof optionally substituted with one or more halogen, hydroxy, alkoxy, alkylthio, nitrile, alkylsulfonate, haloalkylsulfonate, phenyl, a 5-membered heteroaryl, C₃ - C₆ cycloalkyl and C₅ - C₆ cycloalkylkenyl; phenyl optionally substituted with one or more C₁ - C₄ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof, cycloalkyl, cycloalkenyl, haloalkyl, alkoxy and nitro; C₃ - C₆ cycloalkyl, C₅ - C₆ cycloalkenyl, alkoxy, alkenoxy, alkynoxy, dialkylamino, and alkylthio;

and the second amine substituent is selected from the group consisting of hydrogen; C₁ - C₆ straight or branched alkyl, alkenyl, or alkynyl groups or mixtures thereof optionally substituted with one or more halogen, hydroxy, alkylcarbonyl, haloalkylcarbonyl, alkoxy carbonyl, and dialkylphosphonyl;

B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p) --; or when Q is C, W is selected from --C(R₃)_p H_(2-p) --, --N(R₃)_m H_(1-m) --, --S(O)_p --, and --O--;

X is O or S;

n is 2;

m is 0 or 1;

p is 0, 1, or 2;

wherein the two R groups are combined to form a nonheterocyclic ring fused to said furan ring which is not benzofuran when A is --C(X)-- amine, B is --W_m(Q)--(R₂)₃, and Q is C or Si, said R groups being selected from the group consisting of C₁ - C₄ alkyl, alkenyl, C₃ - C₆ cycloalkyl and cycloalkenyl, each optionally substituted with hydroxy, thio, phenyl, C₁ - C₄ alkoxy, alkylthio, alkylsulfinyl, or alkylsulfonyl; and

each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino; wherein further when Q is C, then two R₂ groups may be combined to form a cyclo group with Q;

R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; and

5 R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄ ;
or an agronomic salt thereof.

13. The method according to claim 2, wherein Z₁ and Z₂ are C and are part of a thiophene ring.

14. The method according to claim 13. wherein A is -C(O)-
10 amine, wherein the amino radical is substituted with one or two groups selected from hydrogen; hydroxy; alkyl, alkenyl, and alkynyl, which may be straight or branched chain or cyclic; alkoxyalkyl; haloalkyl; hydroxyalkyl; alkylthio; alkylthioalkyl; alkylcarbonyl; alkoxy carbonyl; aminocarbonyl; alkylaminocarbonyl; cyanoalkyl; mono- or dialkylamino; phenyl, phenylalkyl or phenylalkenyl, each optionally substituted with one or more C₁ - C₄ alkyl, alkoxy, haloalkyl, C₃ - C₆ cycloalkyl, halo, or nitro groups; and C₁ - C₄ alkyl or alkenyl substituted with pyrimidinyl, thienyl, or furanyl; and wherein 15 the amino radical may be a N-bonded heterocycle selected from morpholine, piperazine, piperidine, pyrrole, pyrrolidine, imidazole, and triazoles, each optionally substituted with C₁ - C₆ alkyl groups.

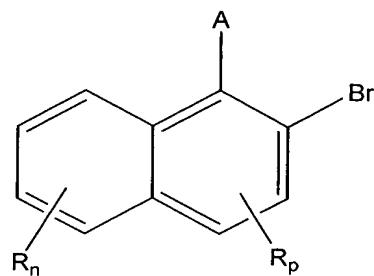
20 15. The method according to claim 14, wherein in -W_m-, m is 0.
16. The method according to claim 15, wherein Q is Si.
17. The method according to claim 16, wherein each R₂ is C₁ - C₄ alkyl or haloalkyl.

25 18. The method according to claim 17, wherein each R₂ is methyl.

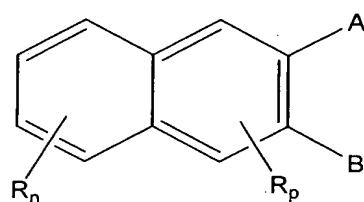
19. The method according to claim 18, wherein A is alkylaminocarbonyl or dialkylaminocarbonyl.

30 20. The method according to claim 1, wherein the fungicide comprises 4,5-dimethyl-N-2-propenyl-2-(trimethylsilyl)-3-thiophenecarboxamide.

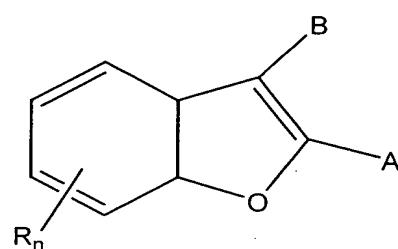
21. The method according to claim 1, wherein the fungicide comprises a compound having the formula:



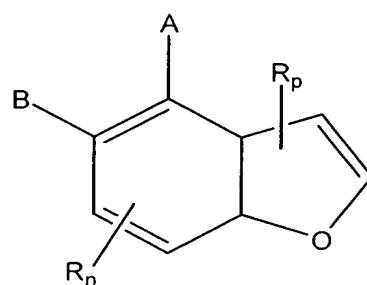
(a)



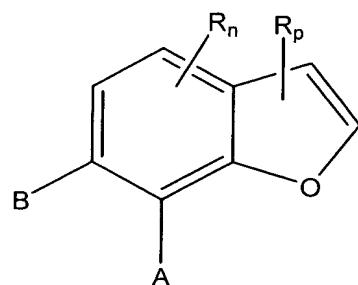
(b)



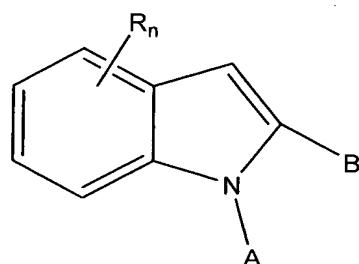
(c)



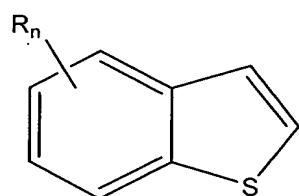
(d)



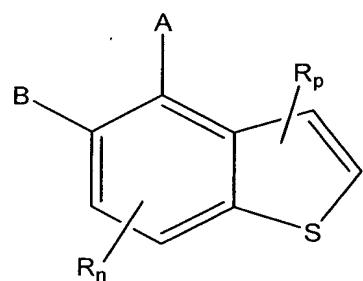
(e)



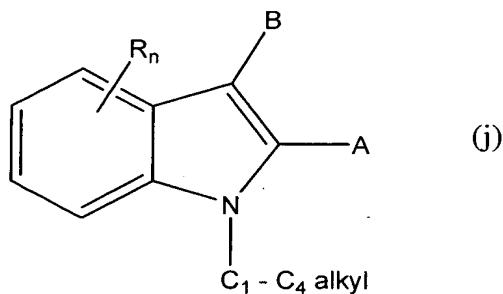
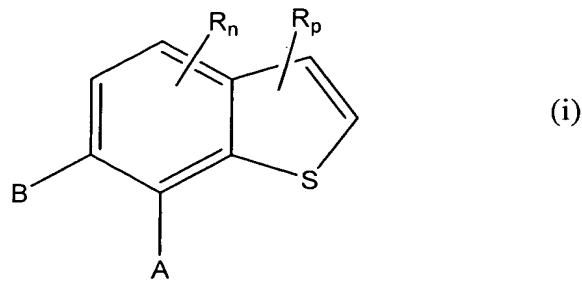
(f)



(g)



(h)



5 where A is $-\text{C}(\text{X})\text{-amine}$; B is $-\text{W}_m-\text{Q}(\text{R}_2)_3$; and A can be B when
B is A except when the formula is f), then Q cannot be Si;
Q is C or Si;
W is $-\text{NH}-$, $-\text{O}-$ or NCH_3- ;
X is O or S;

10 m is 0 or 1, provided that m is 0 when Q is Si;
n is 0, 1, 2, or 3;
p is 0, 1 or 2, and n plus p is equal to or less than 3;
each R is independently selected from
a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato,
15 trimethylsilyl, and hydroxy;
b) C_1-C_4 alkyl, alkenyl, alkynyl, C_3-C_6 cycloalkyl, and cycloalkenyl,
each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano,
formyl, phenyl, C_1-C_4 alkoxy, alkylcarbonyl, alkylthio, alkylamino,

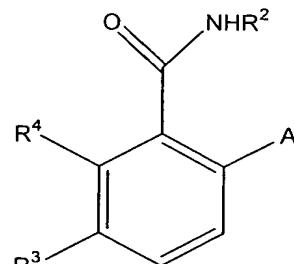
dialkylamino, alkoxycarbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

5 c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁–C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

10 d) C₁–C₄ alkoxy, alkenoxy, alkynoxy, C₃–C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxycarbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo; each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino; wherein

15 two R₂ groups may be combined to form a cyclo group with Q; R₄ is C₁–C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; or an agronomic salt thereof.

22. The method according to claim 1, wherein the fungicide comprises a compound having the formula:



20

wherein R² is ethyl, iso-propyl, propyl or allyl;

A is N(CH₃)_{1-n} H_n R⁵ or OR⁶ wherein n is 0 or 1, R⁵ is (CH₃)_m (CH₃CH₂)_{3-m} C, 1-methyl-1-cyclopentyl, 1-methyl-1-cyclohexyl or 2,3-dimethyl-2-butyl wherein m is 0, 1, 2 or 3 and R⁶ is independently R⁵, or 2,3,3-trimethyl-2-butyl;

R^3 is H or independently R^4 ; and

R^4 is halo or CH_3 ;

with the proviso that when A is $N(CH_3)_{1-n} H_n R^5$, if R^3 is H and R^5 is 1-methyl-1-cyclohexyl or $(CH_3)_m (CH_2 CH_3)_{3-m} C$, where m is 0 or 3, or if R^3 is halo and R^2 is $(CH_3)_m (CH_3 CH_2)_{3-m} C$, where m is 3, then R^2 cannot be ethyl;

and with the proviso that when A is OR^6 then m is equal to or less than 2, and if R^3 is H or halo and R^2 is ethyl or isopropyl, then R^6 is $(CH_3)_M (CH_3 CH_2)_{3-M} C$ where m is 1;

10 or an agronomic salt thereof.

23. The method according to claim 2, wherein the active agent comprises 4,5-dimethyl-N-2-propenyl-2-(trimethylsilyl)-3-thiophenecarboxamide.

24. The method according to claim 1, wherein the agronomic plant is selected from the group consisting of corn, cereals, barley, rye, rice, vegetables, clovers, legumes, beans, peas, alfalfa, sugar cane, sugar beets, tobacco, cotton, rapeseed (canola), sunflower, safflower, and sorghum.

25. The method according to claim 1, wherein the agronomic plant is a member of the class Magnoliopsida.

26. The method according to claim 25, wherein the agronomic plant is a member of the order Fabales.

27. The method according to claim 26, wherein the agronomic plant is a member of the family Fabaceae.

28. The method according to claim 27, wherein the agronomic plant is a member of the sub-family Papilionoideae or Faboideae.

29. The method according to claim 28, wherein the agronomic plant is selected from the group consisting of *Pisum spp.*, *Medicago spp.*, *Arachis spp.*, *Glycine spp.*, *Vicia spp.*, *Vigna spp.*, trefoil, clovers and *Phaseolus spp.*

30. The method according to claim 29, wherein the agronomic plant is a soybean plant.

31. The method according to claim 1, wherein the step of treating the plant or its propagation material comprises treating the seed with an effective amount of the fungicide.

5 32. The method according to claim 1, wherein the step of treating the plant or its propagation material comprises applying the fungicide to the foliage of the plant.

33. The method according to claim 31, wherein the agronomic plant is a member of the family Fabaceae.

10 34. The method according to claim 33, wherein the agronomic plant is a member of the sub-family Papilionoideae or Faboideae.

35. The method according to claim 34, wherein the agronomic plant is selected from the group consisting of *Pisum spp.*, *Medicago spp.*, *Arachis spp.*, *Glycine spp.*, *Vicia spp.*, *Vigna spp.*, trefoil, clovers and *Phaseolus spp.*

15 36. The method according to claim 31, wherein the seed is treated with an inoculant comprising *Azospirillum spp.*, or *Rhizobium spp.*, or *Bradyrhizobium spp.*, or a mixture of *Rhizobium spp.* and *Bradyrhizobium spp.*, or a mixture of either *Rhizobium spp.*, or *Bradyrhizobium spp.* with any other microorganisms.

20 37. The method according to claim 36, wherein the seed is treated with an inoculant comprising *Bradyrhizobium japonicum*.

38. The method according to claim 31, wherein the seed is treated with an amount of the composition sufficient to include the fungicide in an amount that is within the range of about 0.1 gm/100 kg of seed to about 500 gm/100 kg of seed.

25 39. The method according to claim 38, wherein the seed is treated with an amount of the composition sufficient to include the fungicide in an amount that is within the range of about 10 gm/100 kg of seed to about 100 gm/100 kg of seed.

30 40. The method according to claim 39, wherein the seed is treated with an amount of the composition sufficient to include the

fungicide in an amount that is within the range of about 20 gm/100 kg of seed to about 50 gm/100 kg of seed.

41. The method according to claim 31, wherein the treatment of the seed of the plant comprises, in addition, treatment of the seed with a 5 fungicide selected from the group consisting of fludioxonil, fluquinconazole, difenoconazole, captan, metalaxyl, carboxin and thiram.

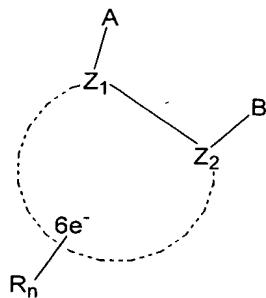
42. The method according to claim 30, where the treatment of the seed comprises treatment with an inoculant comprising *Azospirillum spp.*, or *Rhizobium spp.*, or *Bradyrhizobium spp.*, or a mixture of 10 *Rhizobium spp.* and *Bradyrhizobium spp.*, or a mixture of either *Rhizobium spp.*, or *Bradyrhizobium spp.* with any other microorganisms.

43. The method according to claim 1, wherein the seed possesses a transgenic event providing the plant with resistance to a herbicide and the treatment comprises foliar application of said herbicide.

44. The method according to claim 43, wherein the herbicide is selected from the group consisting of glyphosate, glyphosate, 15 imidazolinone and STS system.

45. The method according to claim 31, wherein the seed possesses a transgenic event providing the plant with resistance to a 20 herbicide selected from the group consisting of glyphosate, glyphosate, imidazolinone and STS system and the treatment comprises foliar application of said herbicide.

46. The method according to claim 1, wherein the treatment comprises treating the seed of the plant with an inoculant selected from 25 the group consisting of *Azospirillum spp.*, *Rhizobium spp.*, *Bradyrhizobium spp.*, a mixture of *Rhizobium spp.* and *Bradyrhizobium spp.*, and a mixture of either *Rhizobium spp.*, or *Bradyrhizobium spp.* with any other microorganisms, and further includes foliar treatment of the plant with a compound having the formula



wherein Z_1 and Z_2 are C or N and are part of an aromatic ring selected from benzene, pyridine, thiophene, furan, pyrrole, pyrazole, thiazole, and isothiazole;

5 A is selected from $--C(X)-\text{amine}$, $--C(O)-SR_3$, $--NH-C(X)R_4$, and $--C(=NR_3)-XR_7$;

B is $--W_m-Q(R_2)_3$ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R_4 ;

10 Q is C, Si, Ge, or Sn;

W is $--C(R_3)_pH_{(2-p)}$; or when Q is C, W is selected from $--C(R_3)_pH_{(2-p)}$, $--N(R_3)_mH_{(1-m)}$, $--S(O)_p$, and $--O-$;

X is O or S;

n is 0, 1, 2, or 3;

15 m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

20 b) C_1-C_4 alkyl, alkenyl, alkynyl, C_3-C_6 cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C_1-C_4 alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxy carbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

5 d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

10 wherein two R groups may be combined to form a fused ring; each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

15 wherein two R₂ groups may be combined to form a cyclo group with Q;

R₃ is C₁-C₄ alkyl;
R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino;

20 R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;
or an agronomic salt thereof.

47. The method according to claim 46, wherein the seed possesses a transgenic event providing the plant with resistance to a 25 herbicide selected from the group consisting of glyphosate, glyphosate, imidazolinone and STS system and the treatment further comprises foliar application of said herbicide.

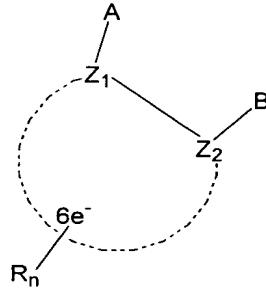
48. The method according to claim 32, wherein the seed possesses a transgenic event providing the plant with resistance to a 30 herbicide and the step of applying the fungicide to the foliage of the plant comprises the application of the fungicide in combination with said herbicide.

49. The method according to claim 48, wherein the herbicide is glyphosate.

50. A method of increasing the vigor and/or the yield of an agronomic plant except for wheat comprising treating an agronomic plant or its propagation material except for wheat with a composition comprising an effective amount of an active agent that has activity against *Gaeumannomyces graminis*.

51. The method according to claim 50, wherein the *Gaeumannomyces graminis* is of the variety *tritici*.

10 52. The method according to claim 50, wherein the active agent comprises a compound having the formula



15 wherein Z_1 and Z_2 are C or N and are part of an aromatic ring selected from benzene, pyridine, thiophene, furan, pyrrole, pyrazole, thiazole, and isothiazole;

A is selected from $--C(X)$ -amine, $--C(O)--SR_3$, $--NH--C(X)R_4$, and $--C(=NR_3)--XR_7$;

20 B is $--W_m--Q(R_2)_3$ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R_4 ;

Q is C, Si, Ge, or Sn;

W is $--C(R_3)_p H_{(2-p)}$; or when Q is C, W is selected from $--C(R_3)_p H_{(2-p)}$, $--N(R_3)_m H_{(1-m)}$, $--S(O)_p$, and $--O--$;

X is O or S;

25 n is 0, 1, 2, or 3;

m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

5 b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxycarbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

10 c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino,

15 dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy carbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

wherein two R groups may be combined to form a fused ring;

20 each R_2 is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R_4 or halogen; and wherein, when Q is C, R_2 may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

wherein two R₂ groups may be combined to form a cyclo group with Q:

25 R₃ is C₁-C₄ alkyl;

R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino;

R_7 is C_1 - C_4 alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R_4 ;

30 or an agronomic salt thereof.

53. The method according to claim 52, wherein the active agent comprises 4,5-dimethyl-N-2-propenyl-2-(trimethylsilyl)-3-thiophenecarboxamide.

5 54. The method according to claim 50, where the treatment of the seed comprises treatment with an inoculant comprising *Azospirillum spp.*, or *Rhizobium spp.*, or *Bradyrhizobium spp.*, or a mixture of *Rhizobium spp.* and *Bradyrhizobium spp.*, or a mixture of either *Rhizobium spp.*, or *Bradyrhizobium spp.* with any other microorganisms.

10 55. The method according to claim 50, wherein the seed possesses a transgenic event providing the plant with resistance to a herbicide and the treatment comprises foliar application of said herbicide.

15 56. The method according to claim 52, wherein the herbicide is selected from the group consisting of glyphosate, glyphosate, imidazolinone and STS system.

20 57. The method according to claim 50, wherein the treatment comprises treating the seed of the plant with an inoculant selected from the group consisting of *Azospirillum spp.*, *Rhizobium spp.*, *Bradyrhizobium spp.*, a mixture of *Rhizobium spp.* and *Bradyrhizobium spp.*, and a mixture of either *Rhizobium spp.*, or *Bradyrhizobium spp.* with any other microorganisms, and further includes foliar treatment of the plant with the fungicide.

25 58. The method according to claim 57, wherein the herbicide is glyphosate.

59. An agronomic plant or its propagation material for which *Gaeumannomyces graminis* is not a disease-causing organism, wherein the plant or its propagation material has been treated with a composition comprising an effective amount of an active agent which has activity against *Gaeumannomyces graminis*, and wherein the plant is not wheat.

30 60. The plant or its propagation material of claim 59, wherein the *Gaeumannomyces graminis* is of the variety *tritici*.

61. A plant or its propagation material which has been treated with a composition comprising a fungicide in an amount sufficient to

increase the yield and/or the vigor of the plant, wherein the fungicide is one having no significant activity against fungal plant pathogens of said plant or its propagation material.

5 62. A plant or its propagation material of the family Fabaceae which has been treated with a composition comprising an active agent which has activity against *Gaeumannomyces graminis* in an amount sufficient to increase the yield and/or the vigor of said plant.

10 63. The plant or its propagation material according to claim 62, wherein the *Gaeumannomyces graminis* is of the variety *tritici*.

15 64. The plant or its propagation material according to claim 62, wherein the active agent comprises 4,5-dimethyl-N-(2-propenyl)-2-(trimethylsilyl)-3-thiophenecarboxamide.

15 65. The plant or its propagation material according to claim 62, where the propagation material is a seed and wherein the plant is a soybean.

20 66. The seed according to claim 65, wherein the seed is contacted with an inoculant comprising *Rhizobium spp.*, or *Bradyrhizobium spp.*, or a mixture of *Rhizobium spp.* and *Bradyrhizobium spp.*, or a mixture of either *Rhizobium spp.*, or *Bradyrhizobium spp.* with any other microorganisms.

67. The seed according to claim 66, wherein the seed is contacted with a fungicide selected from the group consisting of fludioxonil, fluquinconazole, difenoconazole, captan, metalaxyl, carboxin and thiram.

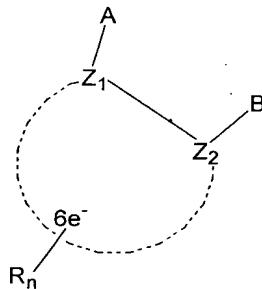
25 68. The seed according to claim 62, wherein the seed has been contacted with an active agent which has only weak, or no activity against one or more disease causing organisms selected from the group consisting of *Phytophthora spp.*, *Rhizoctonia solani*, *Colletotrichum spp.*, *Septoria glycines*, and *Fusarium solani*.

30 69. The plant or its propagation material according to claim 62, wherein the plant or its propagation material has a transgenic event.

70. The plant or its propagation material according to claim 62, wherein the plant or its propagation material is the product of a QTL-based selective breeding program.

5 71. A seed that has been treated by the method of claim 1.

72. A method for increasing the vigor and/or the yield of an agronomic plant or its propagation material comprising treating the seed and/or the foliage of such plant with a compound having the formula:



10 wherein Z₁ and Z₂ are C or N and are part of an aromatic ring selected from benzene, pyridine, thiophene, furan, pyrrole, pyrazole, thiazole, and isothiazole;

15 A is selected from --C(X)-amine, --C(O)—SR₃, --NH--C(X)R₄, and --C(=NR₃)--XR₇;

B is --W_m --Q(R₂)₃ or selected from o-tolyl, 1-naphthyl, 2-naphthyl, and 9-phenanthryl, each optionally substituted with halogen or R₄;

Q is C, Si, Ge, or Sn;

W is --C(R₃)_p H_(2-p) --; or when Q is C, W is selected from --C(R₃)_p H_(2-p) --, --N(R₃)_m H_(1-m) --, --S(O)_p --, and --O--;

20 X is O or S;

n is 0, 1, 2, or 3;

m is 0 or 1;

p is 0, 1, or 2;

each R is independently selected from

25 a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato, trimethylsilyl, and hydroxy;

5 b) C₁-C₄ alkyl, alkenyl, alkynyl, C₃-C₆ cycloalkyl, and cycloalkenyl, each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano, formyl, phenyl, C₁-C₄ alkoxy, alkylcarbonyl, alkylthio, alkylamino, dialkylamino, alkoxycarbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

c) phenyl, furyl, thiienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, C₁-C₄ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) C₁-C₄ alkoxy, alkenoxy, alkynoxy, C₃-C₆ cycloalkyloxy,

10 cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxycarbonyl, (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo;

15 wherein two R groups may be combined to form a fused ring; each R₂ is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R₄ or halogen; and wherein, when Q is C, R₂ may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino;

20 wherein two R_2 groups may be combined to form a cyclo group with Q;

R₃ is C₁-C₄ alkyl;

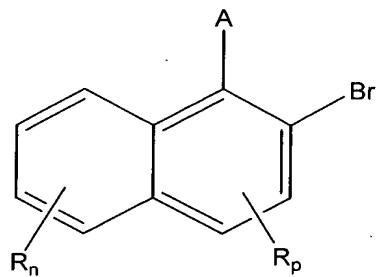
R₄ is C₁-C₄ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino;

R₇ is C₁-C₄ alkyl, haloalkyl, or phenyl, optionally substituted with halo, nitro, or R₄;

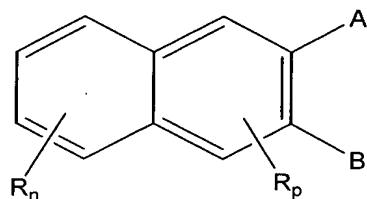
or an agronomic salt thereof.

except that the agronomic plant is not wheat when the compound is silthiofam.

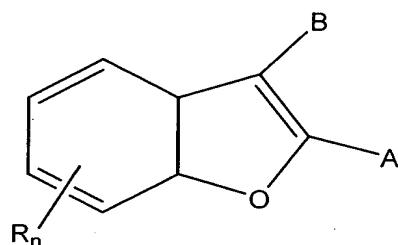
73. A method for increasing the vigor and/or the yield of an agronomic plant or its propagation material comprising treating the seed and/or the foliage of such plant with a compound having the formula:



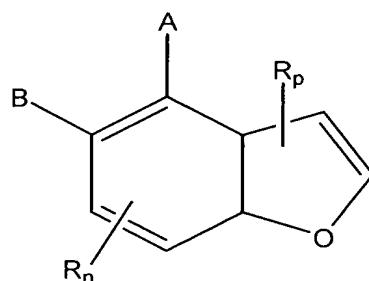
(a)



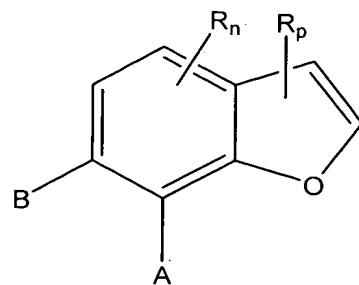
(b)



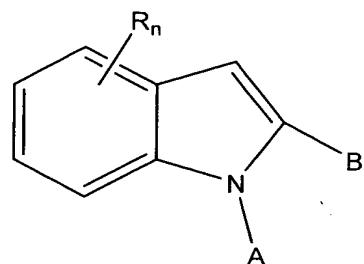
(c)



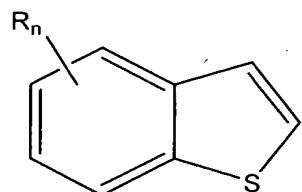
(d)



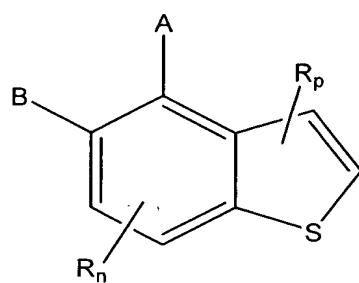
(e)



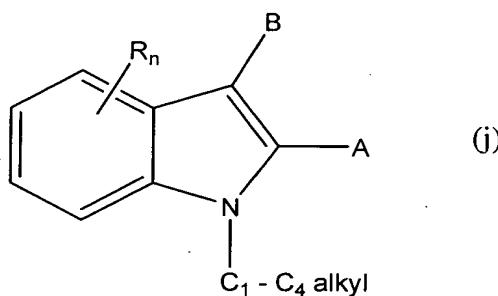
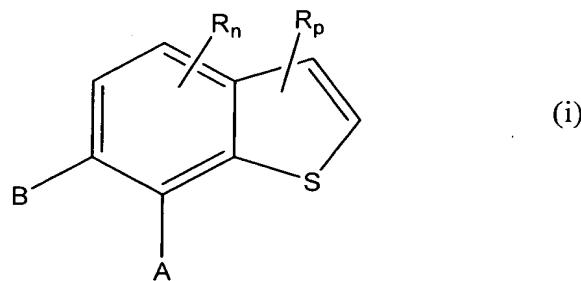
(f)



(g)



(h)



5 where A is $-\text{C}(\text{X})\text{-amine}$; B is $-\text{W}_m -\text{Q}(\text{R}_2)_3$; and A can be B when
B is A except when the formula is f), then Q cannot be Si;
Q is C or Si;
W is $-\text{NH}-$, $-\text{O}-$ or $\text{NCH}_3 -$;
X is O or S;

10 m is 0 or 1, provided that m is 0 when Q is Si;
n is 0, 1, 2, or 3;
p is 0, 1 or 2, and n plus p is equal to or less than 3;
each R is independently selected from
a) halo, formyl, cyano, amino, nitro, thiocyanato, isothiocyanato,
15 trimethylsilyl, and hydroxy;
b) $\text{C}_1 - \text{C}_4$ alkyl, alkenyl, alkynyl, $\text{C}_3 - \text{C}_6$ cycloalkyl, and cycloalkenyl,
each optionally substituted with halo, hydroxy, thio, amino, nitro, cyano,
formyl, phenyl, $\text{C}_1 - \text{C}_4$ alkoxy, alkylcarbonyl, alkylthio, alkylamino,

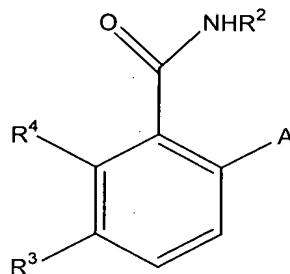
dialkylamino, alkoxycarbonyl, (alkylthio)carbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylsulfinyl, or alkylsulfonyl;

5 c) phenyl, furyl, thienyl, pyrrolyl, each optionally substituted with halo, formyl, cyano, amino, nitro, $C_1 - C_4$ alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylamino, dialkylamino, haloalkyl, and haloalkenyl;

d) $C_1 - C_4$ alkoxy, alkenoxy, alkynoxy, $C_3 - C_6$ cycloalkyloxy, cycloalkenyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, dialkylamino, alkylcarbonylamino, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkylcarbonyl, alkylcarbonyloxy, alkoxycarbonyl,

10 (alkylthio)carbonyl, phenylcarbonylamino, phenylamino, each optionally substituted with halo; each R_2 is independently selected from alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl and phenyl, each optionally substituted with R_4 or halogen; and wherein, when Q is C, R_2 may also be selected from halo, alkoxy, alkylthio, alkylamino, and dialkylamino; wherein 15 two R_2 groups may be combined to form a cyclo group with Q; R_4 is $C_1 - C_4$ alkyl, haloalkyl, alkoxy, alkylthio, alkylamino, or dialkylamino; or an agronomic salt thereof.

20 74. A method for increasing the vigor and/or the yield of an agronomic plant or its propagation material comprising treating the seed and/or the foliage of such plant with a compound having the formula:



wherein R^2 is ethyl, iso-propyl, propyl or allyl;

25 A is $N(CH_3)_{1-n} H_n R^5$ or OR^6 wherein n is 0 or 1, R^5 is $(CH_3)_m (CH_3 - CH_2)_{3-m} C$, 1-methyl-1-cyclopentyl, 1-methyl-1-cyclohexyl or 2,3-dimethyl-

2-butyl wherein m is 0, 1, 2 or 3 and R⁶ is independently R⁵, or 2,3,3-trimethyl-2-butyl;

R³ is H or independently R⁴; and

R⁴ is halo or CH₃;

5 with the proviso that when A is N(CH₃)_{1-n} H_n R⁵, if R³ is H and R⁵ is 1-methyl-1-cyclohexyl or (CH₃)_m (CH₂ CH₃)_{3-m} C, where m is 0 or 3, or if R³ is halo and R² is (CH₃)_m (CH₃ CH₂)_{3-m} C, where m is 3, then R² cannot be ethyl;

10 and with the proviso that when A is OR⁶ then m is equal to or less than 2, and if R³ is H or halo and R² is ethyl or isopropyl, then R⁶ is (CH₃)_M (CH₃ CH₂)_{3-M} C where m is 1;

or an agronomic salt thereof.

15 75. A method for increasing the vigor and/or the yield of an agronomic plant or its propagation material except for wheat comprising treating the seed and/or the foliage of such plant with silthiofam.

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